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This serial report contains press and radio coverage on the development of and progress in the various theoretical and applied scientific disciplines and technical fields; and the administration, structure, personnel, and research plans of leading East European scientific organizations and institutions, particularly the academies of sciences.

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ABSTRACTS

CEMA COMPUTER EXHIBITION TO SHOW LATEST PRODUCTS, SYSTEMS

Budapest SZAMITASTECHNIKA in Hungarian No 5, May 79 pp 1,2

[Article by J. P. Szelivanov: "Jubilee Exhibition. Accomplishments and Future Tasks of ESER Cooperation"]

[Text] The exhibition showing the ten-year activity of experts of the socialist countries, scheduled to be opened in Moscow on 14 June, will be a major event in the operations of enterprises and institutions participating in the ESER [Unified Computer System] project. The basic goal of the exhibition is not only to display the new hardware and software products but also to illustrate their use in the solution of a wide variety of problems in individual sectors of the national economy.

The new computers will be displayed in the so-called engineering sector of the exhibition. This will be, in fact, a major, multicomputer computer center with modern magnetic data carriers and other devices. It will display equipment of Series 2 of the ESER system: ESER 1015 (made in Hungary), ESER 1025 (Czechoslovakia), ESER 1035 (Bulgaria and USSR), ESER 1045 (USSR), ESER 1055 (GDR), and ESER 1060 (USSR). The speed of the devices is between 15 and 1,200 thousand operations per second.

The devices in ESER Series 2 differ from those in Series 1 in many ways. Their operating principle will be improved, so that they have a larger command complement and are capable of displaying data of variable length; they will feature new checking and diagnostic facilities. A major new feature is that diagnostic programs can be loaded from the console also. In developing these devices, one of the most important tasks was to create program compatibility with devices from Series 1. Memory capacity doubled to quadrupled from that found in Series 1; and from ESER 1035 onward there is virtual addressing to facilitate the use of the computer in time-sgaring systems. The throughput of the channels increased significantly, and there is now the possibility of block-multiplex operation. In the smaller

computers, high-speed magnetic-disk and magnetic-tape devices are connected to the processor via a file adapter, bypassing the channel and the control unit. A display may be used instead of the operator's console in devices of Series 2. Overall, we may state that the new devices are improved in terms of their engineering and economical parameters, permit better practical utilization in more areas in all sectors of the national economy, and allow the use of various operating modes, as well as the establishment of multiprocessor and multicomputer systems.

Computer complexes will also be displayed at the exhibition. For example, the ESER 1060 will be shown in conjunction with the VK 2R-60 computer complex. The exhibition will also display equipment from the MSZR [Minicomputer System] family in conjunction with major systems. A MSZR unit is connected to the ESER 1060 via an input/output interface, and performs the role of a satellite computer capable of performing limited independent data processing. Another MSZR device is in the "system" area and is connected to the large computer via channel and via multiplexer as an intelligent terminal.

Data teleprocessing systems, where the user is connected to the computer via terminals through input/output channels, occupy a very important position in the exhibition. The data teleprocessing devices (terminals, modems, data-transmission multiplexers) are displayed as systems together with full hardware and software complement.

The experts will doubtlessly be interested in the terminals designed for the solution of a variety of specific problems, for example data acquisition devices for commerce of railway ticket sales (GDR), or devices for handling bank transactions (Hungary, Poland). Bulgaria exhibits the ESER TEL-4 system, in which the major innovation—compared to the already known ESZTEL-2—is the ESER 8371 processor. This is a more flexible device and offers broader possibilities than the data-transmission multiplexer. The data teleprocessing system exhibited by Poland is also based on this processor. The system in the Hungarian exhibit contains the ESER 8410 and ESER 8421 data-transmission multiplexers.

The above devices are exhibited in the "systems in operation" section, so that in some instances the computer located in the computer center will communicate with another computer elsewhere in the city, in another city, or even another country via telephone wires. In general, the systems exhibited in this section will operate in the dialog mode. The most modern system here will be the ESER 7920 monitor-screen system, developed jointly

by the GDR, the USSR, and Czechoslovakia. Depending on the need, this system may operate as an individual or a group display, with local or remote mode of operation. Together with the associated printer, it permits the recording of the dialog.

In addition to computers, the exhibition will also display many peripheral devices. First to mention is the 100- and 200-mbyte magnetic-disk systems (USSR and Bulgaria). We may also view new magnetic-tape units with a signal density of 63 characters/mm and a transmission rate of 190 kbyte/sec. The new devices will be exhibited together with conventional input/output units such as card readers and printers. Part of the ESER 1055 system is the ESER 7602 microfilm output unit, which permits new possibilities for the computerized handling of files. The data-preparation devices with individual and group magnetic-disk and magnetic-tape units are also likely to be viewed with interest.

Devices of ESER Series 2 also have better component base than their predecessors. In addition to integrated circuits, they feature new circuits with a high degree of integration (LSI). The ESER 1035 computer has an operative memory (ESER 3236) based on LSI's. We may state that the computers exhibited at the show represent an intermediate step toward computers based on LSI's. A separate section of the exhibition, which displays the development of the component basis, will show various types of LSI, among others such microprocessors which may be used over a wide area in many control systems, terminals, and perhaps also processors. In the design-automation systems section the GDR exhibits such a system based on microprocessors. Microprocessor-based computers will also be shown in the section for automated control systems of technological processes.

In the development of the architecture of computers, the trend is toward the creation of such processors which permit the specialization of the hardware toward designated tasks. The so-called matrix processors shown in the exhibition reflect this trend. With their aid, the performance of the computers may be increased 10-15 fold insofar as tasks concerning the processing of matrixes is involved. Matrix processors will be included in ESER 1035 and ESER 1045 computers.

A separate section of the exhibition will illustrate the prospects and basic trends of computer development in the individual countries participating in the ESER project. The engineering and economical parameters must increase 3-5 fold; reliability must increase 2-3 fold; certain functions of the operating system must be included in the hardware; special processors must be developed; the devices for dialog operation and data

teleprocessing must be further developed; and so forth. These projects are closely related to the development tasks for the MSZR.

The basic feature of the exhibition is that the above devices and parts of them are shown in operation, so that the experts may obtain a better insight in the equipment and their possible applications. Most of the devices use standard software. A separate section displays devices for the automation of administrative or technological control of guidance systems. These devices are based on standard modules.

Overall, the systems to be exhibited by the individual countries cover practically all sectors of the national economy, the sectors not related to production, and the use of the computers in scientific projects.

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INTERNATIONAL CONFERENCE ON AGROMETEOROLOGY CONVENED IN HUNGARY

Budapest MAGYAR HIRLAP in Hungarian 22 Jun 79 p 5

[Article by Jeno Csallo:"International Information Exchange of Agrometeorologists. Forecasts for Higher Yields"]

[Text] Agrometeorological specialists of the European socialist countries conferred in Hungary for a period of one week about improvements in the agrometeorological services established for agriculture and the expansion of the coverage of scientific forecasts. Fourteen papers were presented at the session of the working committee. Delegates from the participating countries reported—within the framework of information exchange—about their methods of yield forecasting and other agrometeorological services. Among others, they stressed the following: The already standardized observations and measurements for soil surface and the soil itself must be developed further; and aerial and artificial-satellite observarions must be furthered to speed up the supplying of data and making the data more accurate. Among the papers presented was that of Zoltan Varga-Haszonits, director of the Central Forecasting Institute, who described the agrometeorological methods developed for the megye-by-megye forecasting of the yields of autumn wheat.

Two main subjects were discussed in the conference. O. Sirotenko, the Soviet agrometeorologist, described a simulation mathematical-biological model in his paper. The model is based on the dynamics of plant growth, and creates improved prerequisites for scientific forecasting. By monitoring the growth stages of various plant cultures, it provides guidelines for agricultural establishments on expected yield increases by interventions carried out at the proper time and in the proper manner. Another Soviet agrometeorologist, V. Dmitrenko, described the methods for forecasting the yield of the most important agricultural plant cultures. These methods have already been used in practice with satisfactory results.

After the discussions we asked Sandor Dunay, head of the agrometeorological department of the Central Forecasting Institute, to summarize the following: How are the agrometeorological forecasts used in Hungary in actual practice?

He stated, among others, the following: "On the basis of data from the nationwide observation system we provide forecasts for the most likely trends to the supervisory organs involved, institutions, and agricultural establishments, to allow them to determine the measures needed to obtain higher yields and improved product quality, using the appropriate equipment, methods, and techniques. We do not instruct anyone to start irrigating a certain area. All we do is to advise those concerned about the water reserve of the soil, the plant types for which this reserve is sufficient, and the cultures which require water replenishment. In other words, we provide information to assist decisionmaking and to permit the evaluation of the prevailing situation."

"We issue regular forecasts of the service type since just about ten years; however, our work has expanded during the most recent years since it was during this period that there was a sudden increase in the needs as a result of the spreading of the modern, industrial-scale methods and, primarily, as a result of the establishment of production systems. We also have weekly and monthly forecasts (soil moisture, soil temperature, evaporation intensity, growth state, and so forth); however, for agricultural establishments using systematic irrigation (1,800 to 2,000 addresses), we supply the data based on measurements and observations in ten-day intervals, and also issue our agrometeorological forecasts for the next ten days. The latter information also includes data concerning the areas where no precipitation is expected during the next ten days, and for such areas data about the evaporating capacity of the plant cultures in their current growth stage, as well as the expected decrease in soil water content with the intensity of natural evaporation being taken into consideration."

"We have another special service also. Certain farms ask us to carry out agroclimatological surveying in cases where they plan to introduce a new crop, or where they plan to establish orchards or vineyards. On the basis of our soil maps as well as on the basis of the results of any site observations needed and of data concerning the frequency of meteorological events (annual precipitation, precipitation distribution, airflow, mean temperature, drafts, frost, and the like), we determine whether it makes sense to grow certain types of crops over the areas involved. It can be

thus seen that we provide decisionmaking assistance for the agricultural establishments here also. This service is related to another service, which we are in the process of preparing. In the years to come, we will develop more modern and more effective methods for protecting plants from frost, and we expect that these methods will also be more economical. Needless to say, if we can demonstrate practical results, we will inform the agrometeorological working committees of the European socialist countries to this effect, so that they can try and implement them. In turn we benefit from the achievements of other members of our community.

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BRIEFS

SPACE MEDICINE-BIOLOGY CONFERENCE--The twelfth meeting of the working group for space medicine and biology ended at the Military Institute for Aviation Medicine in Warsaw within the framework of the "Interkosmos" program. Specialists in this field of knowledge from the socialist countries, including Cuba and Mongolia, participated in this meeting. The results of separate and joint biological and medical research conducted during manned flights and on biosatellites were presented at this meeting of scientists. Matters, which are related to research under simulated conditions, i.e., on earth, and pertain to problems regarding simulated weightlessness, study of the equilibrium organ, their utilization for space medicine requirement, thermo-control of biorhythms, radiobiology, protection against radiation, etc, were discussed at each of the problem sessions. The list of matters expected to be resolved on spacecraft under laboratory conditions and on biosatellites was also discussed. For example, activities related to the study of bio-rhythms and development of bred mammals were planned to be conducted in 1979. In addition, the possibility of joint construction of equipment and its utilization for space flights was discussed. [Excerpts] [Warsaw ZOLNIERZ WOLNOSCI in Polish 29 Jun 79 pp 1, 2]

FORTHCOMING INTERKOSMOS BIOSATELLITE LAUNCHING--Prof Nikolay Nikolayevich Gurovski, leader of the Soviet "Interkosmos" Space Medicine and Biology Group, reported that a biosatellite for conducting an international (also Polish) research program will be launched in September, 1979. Mice will be launched into space; some of them will become pregnant on earth, and others in the satellite. The mice will orbit in space for a period of 21 days, i.e., for almost the entire period of pregnancy. After the mice are returned to earth, they will be examined to determine in what way the flesh develops under space conditions. [Excerpt] [Warsaw EXPRESS WIECZORNY in Polish 27 Jun 79 pp 1, 2]

CSO: 2602

SUMMARIES OF DEVELOPMENTS AT THREE COMMUNICATIONS INDUSTRY ENTERPRISES

Budapest MUSZAKI KOZLEMENYEK in English No 1, 1979 p 46

[Text] Matusik, Ferenc C. El. Eng. Typ BM-24 24 channel carrier frequency multiplex system for radio relay lines

Telefongyar has developed a new 24 channel multiplex equipment for radio relay lines. This article introduces the electrical and mechanical structure and the main technical data of this equipment.

Schleer, Bela Mech. Tech., Sipos, Ferenc Mech. Tech. Hardsoldering in gas-sealed furnace with solder of low melting point

The paper calls attention to a more wide spreading up-to-date technology, the furnace soldering. Through a real soldering example the gas-sealed furnace soldering of the microwave invar filter developed in the ORION is introduced.

Csik, Margit C. El. Eng., Koracs, Antal C. El. Eng., Zakarias, Zsuzsa C. Programmer Computer system for aiding technical tender making and processing for telephon public exchanges

BHG Telecommunications Works bought the licence of AR telephon exchanges from LM Ericsson of Sweden in 1968. In the years following the licence buying tenders were made for 15-30 thousands of lines per years. The line number nearly reached the 100 thousands in 1978, and it will expectantly raise up to 180 thousands of lines by 1980. With the classical methods of tender making and processing hardly can be keep up with the significant raising of line numbers.

Dr. Kerpan, Istvan C. El. Eng. Masszine Windisch, Nora C. El. Eng. On the testing automata of communications industry

This article deals with the characteritic qualities of testing automata for circuit checking and the influence of these ones on the number and composition of manpower.

Molnar, Laszlo C. El. Eng. An overview of the mechanical-dynamical tests of relay sets*

At the BHG Telecommunication Works a lot of tests have been carried out on relay sets of crossbar exchanges in the past years. The object of these tests was to study the fault mechanism during operation and the shipping and to cease these faults. Several up-to-date test methods have been worked out. This article is to summarize these ones.

*This article has been made on the base of the author's lecture at the INGENIURHOCHSCHULE WISMAR (GDR) I. Technical Days.

Technical Review

Malesiner, Ferenc El. Eng. Interesting experiences on the utilization of solar energy on locale

CSO: 2502

ROLE OF DEBRECEN CYCLOTRON IN SCIENCE, PRACTICE

Budapest MAGYAR TUDOMANY in Hungarian No 5, May 79 pp 332-336

[Article by D. Berenyi, Director of the Nuclear Research Institute of the Hungarian Academy of Sciences: "What Is the Meaning of the Debrecen Cyclotron From the Viewpoint of the Requirements of Science and Practice"]

[Text] After an extended, multidirectional preparatory work in April, 1978, the Committee on Science Policy approved the joint submission of the Hungarian Academy of Sciences, the National Technical Development Committee and the National Atomic Energy Committee concerning the establishment of the first cyclotron laboratory in the country in Debrecen, at the Nuclear Research Institute of the Hungarian Academy of Sciences. Following this act, the Secretary General of the Hungarian Academy of Sciences signed the document of the investment goal on July 11 .

During the preparatory work and since its completion, we presented information through many media, not only about the most important data concerning the investment and in connection with it, about the cyclotron scheduled to be purchased, but also about the reason which induced our Academy, and with it the National Technical Development Committee and the National Atomic Energy Committee to approve the investment.

It is well known that the cyclotron, a device discovered at the beginning of the thirties for accelerating particles, has been used for a long time as a tool for other than exclusively nuclear investigations. We encounter cyclotrons in hospitals and in industrial plants and there are even more cyclotrons which - although are operated in nuclear laboratories - are used to take care of many-faceted interdisciplinary and practical tasks. This explains that a small country, such as Finland, has established in recent years two cyclotron laboratories, and the socialist countries surrounding ours do not only possess a cyclotron but are in progress to install and to start up new machines.

In the following, I would like to report on the reasons behind the selection of the type of domestic cyclotron, the advantages and the limitations of the

cyclotron to be purchased, and about the timeliness of this investment, emphasizing the planned application of the cyclotron in the various branches of science, and in satisfying practical requirements.

The U-103 Cyclotron and the Timetable of the Investment.

In view of our science policy and the current economic situation, it is obvious that only the socialist market can be considered for the purchase of the cyclotron, and even there, we have to select a type with a well-established and tested construction that the manufacturing company is able to deliver within reasonable time. Building the cyclotron ourselves, or eventually as an international cooperative effort, did not seem to be practicable from the very beginning. This would exceed our capabilities and even in the best case it would call for a long-lasting investment, interfering with our efforts which yielded internationally recognized results, of interest for practical applications and even for the national economy.

Taking all these factors into account, in principle there was only a single possibility: the modern, so-called isochronous cyclotron, designated as U-103 and also as MGC, of the D.V. Efremov Scientific Research Institute for Electron Physical Installations of Leningrad. This machine has operated well and to the full satisfaction of the users at the University of Turku (Abo Akademi) for many years. Several collaborators of the Nuclear Research Institute have visited this cyclotron laboratory, and we obtained from it, and naturally from the manufacturing institutions in Leningrad, all the necessary information. We were able to receive considerable support from the International Atomic Energy Agency in Vienna for the purchase: not counting the building and the other expenses, about one half of the purchase price of the cyclotron is covered by the Agency.

Although the dimensions of the cyclotron are relatively small,(the polar diameter is 103 cm), the data (energy and intensity) concerning the particles and beams accelerated by it are just about as good or even better than those of the so-called "Conventional Peoples' Republic" cyclotrons supplied by the Soviet Union during the second half of the fifties to socialist countries. (Among the European socialist countries, only Bulgaria and Hungary do not have such a cyclotron).

One of the basic limitations of the U-103 is that it cannot accelerate heavy ions (for example, ^{12}C, ^{16}O, etc). Outside of nuclear physics, this represents a shortcoming in applications in the fields of solid state physics, materials research and atomic energy. On the other hand, the machine is able to deliver an He-3 beam which not all cyclotrons, in particular not the previously mentioned earlier types, are able to do.

In summary: the U-103 cyclotron represents a modern machine within its own category. Obviously, it does not belong among the large accelerators of the world, but such a machine is not needed to solve problems which would be assigned to the proposed cyclotron laboratory.

The possession of a cyclotron would not propel us by itself to the front line of research in any of the disciplines. This machine is only one of the necessary tools, the use of which is indispensable to ensure that we are not left behind in the solution of a large number of scientific and practical tasks, or to enable us to reach the leaders in the subject fields in question. Let me use an illustration: the large numbers of electron microscopes operated in the country do not imply by themselves that we are in the front line in any research or industrial area. But everybody can see that without electron microscopes, it is impossible to carry out modern research and even an up-to-date industry cannot function effectively without their help. Finally, I would like to mention one consideration, i.e., whether it would not have been desirable to postpone this purchase for a few years, to await the appearance of a more modern and acquirable cyclotron (i.e., one manufactured in a socialist country).

This appears completely hopeless. Although the development of new types of cyclotrons is under discussion at the Efremov Institute, none of them is close to realization and they are not expected to be so relatively universal as the U-103, which is required to satisfy the multilateral Hungarian requirements. At the same time, we must take into account that the transition time of the cyclotron's investment cycle, including building construction, amounts to at least 5 to 6 years; therefore, we must start rapidly the preparatory work, because in any case we have to wait 5 or 6 years until the device in its fully finished form is ready for routine operation.

The timetable of the investment cycle is as follows:

Summer 1978:	The investment goal has been defined.
Summer 1979:	The investment program is completed.
Summer 1980:	The detailed plans are prepared.
1981:	Building construction has been started during the year.
1982-83:	Completion of the construction.
1983-84:	Delivery, installation and transfer of the cyclotron.
1985:	Routine operation.

Applications of the U-103 cyclotron.

According to the plans, about one-third of the total capacity of the cyclotron would be devoted to basic nuclear research. It is not necessary to describe in detail how important is the overall basic nuclear research for the various nuclear applications, but it should be mentioned that they would make (and have made) considerable fringe benefits to the development of vacuum technology, electronics and computer engineering, etc, which are very important for many practical applications.

It can be easily seen what great progress it represents from this viewpoint, that instead of the 5-MeV energy protons used up to now in Hungary (which may be obtained with the help of the Van-de-Graaff generator of the Nuclear Research Institute and the Central Research Institute for Physics), a proton

beam with an energy up to 20 MeV would be available, with an intensity which is 5-10 times higher (number of particles in the beam) than in the present low-energy beam. At the same time, in addition to the proton beam, alpha particles, deuterons and He-3, with both considerably higher energy and intensity than at present, could be also accelerated.

In addition to broadening the possibilities of nuclear physics, the cyclotron will create a basis for Hungarian researchers and research groups to carry out studies in research centers under international cooperation (we refer primarily to the Joint Institute of Nuclear Research of the socialist countries at Dubna, which may be considered an extension of our domestic possibilities, but also other institutions may be considered. Without such a domestic basis, it is not possible to guarantee the proper training of researchers, the acquisition of the required experience, construction of experimental devices and the preparation of experiments to be carried out abroad.

About one-half to two-thirds of the total capacity would be devoted to other branches of science or to expressly practical tasks. The current distribution of research subjects at the Nuclear Research Institute follows more or less this ratio, and this insures that the cyclotron will be operated in the same manner.

The applications of the cyclotron in the various disciplines and for the solution of practical tasks can be divided broadly into three groups: applications for materials research; tasks, the solution of which requires irradiation by the particle beam of the cyclotron; and isotope production. A great variety of applications are encountered in each of the groups. Without any claim of completeness, we attempt to summarize these applications in the following table.

As it can be seen, the materials research applications cover a broad area. We refer primarily to the detection of trace impurities which are present in a very low concentration, and of low order-number elements, such as Be, B, C, N, O, etc., which can be detected only with great difficulty or not at all by other methods. Obviously, the latter includes the elements which are of great interest for biomedical research (such as C, N, O) and those which are of great interest for nuclear energy generation, such as Be or B. In the detection of trace elements, a higher sensitivity is achieved in every case than with any other method; this is of great significance, not only for solid state physics research, but also for modern production methods, primarily in the semiconductor and atomic-energy industry, but also in metallurgy. As far as environmental protection is concerned, the cyclotron may be used to determine rapidly in a large number of samples, trace elements which are deleterious for the health. There are cyclotrons with which the analysis of several hundreds of such environmental protection samples every day are carried out routinely for sums corresponding to 20-30 forints per unit.

Survey of the most important applications of the U-103 cyclotron

	Type	Fields involved
Materials research	Fast-neutron activation analysis (concentration range of 1-10 ppm).	Solid state research and corresponding industrial applications.
	Activation analysis with charged particles (e.g. determination of Be, B, C, N, O, F, S).	Medical and biological research and practice.
		Environmental research.
		Atomic energy research.
	X-ray fluorescence analysis by bombardment with charged particles (multielement analysis.	Criminalogical applications.
		Industrial and agricultural materials research (determination of trace elements)
Isotope production	Short-lived isotopes, (^{11}C, ^{13}N, ^{15}O, ^{43}K, $^{81m}Kr/^{81m}Kr$, ^{123}I, etc).	Medical and biological research, and practice (diagnostics, therapy).
		Corrosion and wear-resistance studies (lubrication technology).
	Long-lived isotopes, (^{7}Be, ^{51}Cr, ^{55}Fe, ^{56}Co, ^{109}Cd, etc).	Biological and chemical tracer studies.
		Industrial and agricultural tracer studies.
Irradiations	Fast-neutron irradiation.	Industrial research, therapeutic irradiation.
	Charged-particle irradiation (p,d, ^{3}He, ^{4}He).	Genetic and radiation-biological researches and corresponding human and agricultural application.

Basically, two types of application of the U-103 are planned for isotope production. The first one involves short-lived isotopes (with half-lifes of the order of minutes or hours) which until now (specifically because of their short half-life) could not be imported from abroad. They include oxygen which has a great biological and medical importance and has only short-lived natural isotopes, but there are other important isotopes also (see table). This will allow using medical research and diagnostic methods in our country which were not available before. Let us mention, for example, the case of I-123. This isotope, which has a half-life of 13.1 hours, as compared with the 8.04 days half-life of I-131, can be used advantageously instead of I-131 for the diagnostic examination of the iodine metabolism of the thyroid. This reduces considerably the radiation burden of the patients during examination and therefore throughout the world, I-131 is being replaced by I-123 in such studies, in particular wherever a low radiation burden is important.

The long half-life isotopes (see table) produced by cyclotrons have been acquired until now from abroad, in particular from capitalist countries. They are used widely not only in science but in many fields of industry and agriculture (in our country, radioactive isotopes are used in about 500 locations and nearly half of these are in industry and agriculture). According to calculations carried out in the Isotope Institute, if the cyclotron would be used only to prepare such isotopes, the investment would be amortized by this application alone within a few years (without taking into account the marketing difficulties). Thus, in the future, it will be possible to prepare these isotopes, or at least a portion of them, domestically. But we must also consider industrial investigations, in which the needed isotope is created in the mechanical component under study by means of direct irradiation with the cyclotron beam (studies on corrosion protection and wear resistance).

The latter specific application leads us to an other type of use, the direct irradiation within the cyclotron beam. There is great interest in biology, in particular in agriculture, concerning the genetic variations induced by such an irradiation. This method is very important in radiation biology also.

The most important application of irradiation of the secondary fast neutrons (which in the case of U-103 have a maximal energy of 30 MeV) obtained from nuclear reactions in the cyclotron (for example by the bombardment of Be, Li, etc. with charged particles) lies in the field of the therapy of cancerous tumors. It was reported at a recent joint scientific session, organized by the Nuclear Research Institute and the Medical University of Debrecen, on the basis of information acquired during a study trip abroad, that the probability of the healing of cancerous tumors after such an irradiation increases by a factor of 2. The Medical University would use about one-third or one-fourth of the accelerating time of the cyclotron for such therapeutic irradiations.

The possibilities of application are not completed with the above. There is need for basic preparatory work and outfitting activity in a great variety of fields, in order to take advantage of the opportunities offered by the cyclotron. Such activities include the above-mentioned joint scientific session of the Medical University of Debrecen and the Nuclear Research Institute, in which representatives of a large number of institutes outside of Debrecen have also participated. Thanks to the close cooperation between the Nuclear Research Institute and the Medical University, the medical facilities to be built next to the cyclotron are expected to satisfy the requirements, and even though our cyclotron will be smaller than many foreign installations, in the opinion of medical experts our facilities will be ultimately better than those installed next to many foreign cyclotrons.

Similarly, discussions are conducted between the Isotope Institute and the Nuclear Research Institute concerning the preparation of long-lived isotopes. If indeed we carry out the preparatory work on the basis of our best knowledge in all the areas, then the concepts that formed the basis of this investment project will be definitely realized.

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MODIFICATIONS, PLANNED CHANGES IN IMMUNIZATIONS

Budapest ORVOSI HETILAP in Hungarian No 24, 17 Jun 79 p 1423

[Article by Drs Laszlo Erdos and Adam Vass, National Institute of Public Health]

[Summary] The Hungarian system of controls permits continuous monitoring of the effects of mass immunizations. Discontinuation of innoculations deemed superfluous has lately been under consideration. In the case of BCG innoculations tuberculination of 6-month old infants who remained without scar has been discontinued, also BCG innoculation and screening of 10-year-olds and the screening and BCG innoculation of 16-18-year-olds and 18-30-year-olds provided the former received BCG innoculation at the age of 13-14 or 16-18 years. To prevent the stress of two innoculations, tuberculin screening and revaccination of BCG-negative youths has been postponed to their seventh or eighth year. Revaccination for smallpox at age 12 has been discontinued as has revaccination against tetanus at attainment of drafting age. Immunization against polio has been timed for the months of September, October and December. Innoculation against measles has been moved from age 10 months to age 14 months.

Because of the uncertainty of its effects vaccination for paratyphus A and B has been discontinued. Because of the lasting effects of the mandatory antitetanus shots, it has been recommended that those born after the first of January 1941 who are in the high-risk category for typhus be protected by monovalent typhus vaccine.

For individuals who have been exposed to typhus and for whom parenteral typhus innoculation is contraindicated, it is recommended that oral vaccine be administered.

It is recommended that live, attenuated rather than inactivated vaccine be used against mumps.

Efforts are being made to introduce vaccine produced from tissue culture rather than brain vaccine for prevention of rabies.

Intensive investigations are being conducted concerning reactivation of antitick-borne encephalitis, its efficiency and manner of use.

CSO: 2502

NEW HUNGARIAN VACCINES FOR VETERINARY USE

Budapest NEPSZABADSAG in Hungarian 22 Jun 79 p 6

[Article by P. G. P.:"To Combat Rabies, Goose Influenza, and Rabbit Diseases. New Hungarian Vaccines for Animal Health"]

[Text] Three important new veterinary vaccines were introduced during last year and this year. One is for inoculation against rabies; as a result of the domestic implementation of foreign experiences, it makes production of vaccine with improved properties easier and more economical. The other is for inoculation of young geese against the so-called goose influenza, a disease that causes great damage in stocks of young geese. The third, developed by Hungarian researchers, is for inoculation against a viral disease which causes damage in stocks of rabbits.

Rabies is a lethal disease, which may also be transmitted by the animals to humans. This viral disease has been the most dreaded disease known to mankind for a long time, until Pasteur developed the vaccination against it during the 1980's. Experiments with the inoculation of dogs in Hungary started in 1929: dogs are the most frequent transmitters of the disease. A large-scale trial was first carried out in the Jaras of Godollo in 1933. In 1938, inoculation became mandatory in the entire country. Hungarian veterinary medicine thereby made a major achievement which was also recognized and praised abroad. The disease was practically eradicated in the country as a result. There was significant deterioration in animal health after the war; however, after 1948 rabies was reduced to such an extent by the use of domestically made vaccines that only two cases of human affliction were recorded during the last 34 years.

In Flasks Instead of in Sheep's Brain

The vaccine is made by introducing the carrier of the disease, more specifically an attenuated version of the virus, into sheep's brains. Once the disease-causing agent reaches its growth maximum in the animal organism—after approximately six days—the sheep is destroyed and the animals' brain and spine marrow is ground up to yield the raw material for the vaccine. Since the entire stock of dogs in Hungary—approximately 1.2 million animals—must be vaccinated against rabies, this means that the amount of vaccine needed would require the sacrifice of 8,000-9,000 heads of sheep. Destruction here is in the strict sense of the term since the meat of the destroyed animals must also be destroyed. Raising, maintaining, accommodating, and slaughtering of so many animals is a major expense and complicates the production of the vaccine. The vaccine made in this manner, containing attenuated virus, has another disadvantage: In 0.4 promille of the vaccinated animals (not much but still representing almost 500 dogs based on Hungary's present dog stock) paralytic affliction was observed, resulting in many cases in the death of the animal.

Hungarian researchers found an excellent solution, which eliminates both problems. The starting point was the fact that it became possible (in the United States during the 1940's) to grow the rabies virus in chicken eggs for the production of the vaccine. During the early 1960's, US researchers succeeded in growing this virus in cell culture, and they also developed a virus strain suitable for vaccine production. This method was further developed in the research institute within the USSR, led by Professor Selimov.

In cooperation with their Soviet colleagues, Hungarian veterinarians introduced a method for the production of vaccine against rabies starting in 1969. The method involves the growing of the virus in the kidney cells of the Syrian golden hamsters, in a flask. The vaccine is made from the contents of the flask. The vaccine made in this manner is lyophilized (dried and powdered) for shipment. This is an important feature since it permits the vaccine to be stored for a relatively long period of time. Earlier, the vaccination had to be carried out within eight days. This required a major organizational effort.

Sixty Thousand Dogs, Not a Single Instance of Paralysis

Before distributing in commerce the preparation called Lyssavac, made from the Vnukovo 32 strain from the USSR by a method modified in Hungary, careful trials were carried out for efficacy and harmlessness, using many animals, ranging from mice through guinea pigs to dogs. Last year, most of the

dogs in Hungary were vaccinated with the new preparation—specifically, 600,000 dogs—and of those vaccinated last year and this year not a single one became paralyzed by rabies. From 1981 onward, all dogs in the country will be immunized with this vaccine.

The new vaccine against the other viral disease will reach the market this year. The so-called goose influenza—which the international literature more and more often calls the Derzsy disease—causes great damage in goose stocks: 30-40 percent of the younger animals may succumb, especially those less than three weeks of age.

The identification of the disease is associated with the late Domokos Derzsy, director of the Research Institute for Animal Health of the Hungarian Academy of Sciences. He and his associates at Phylaxia [Serum and Vaccine Works] prepared a serum against the disease. While this drug, which received patent protection, was effective, it required very much work since each young goose had to be vaccinated and since the serum had to be made from the blood of geese which were repeatedly immunized and then slaughtered. Obviously, preparation of 10,000 to 14,000 liters of serum per year required a major effort. The vaccine designated DF-PAR-VAC, which was developed by the above research institute in cooperation with a Soviet research institute and the staff of Phylaxia, represented a further improvement: it makes the vaccination simpler since it requires that only the egg-laying geese to be inoculated. The antibody that forms in their bodies provides protection to the young geese emerging from the eggs also for the period during which they are particularly receptive to infection.

There Has Nowhere Been Something Like This Before

Myxomatosis is also an infectious disease of viral origin. It causes major damage to rabbit stocks; most of the animals succumb, and the remainder utilizes the fodder poorly. Last, but not least, every country imposes import restrictions against animals originating from stocks infected with this disease.

Pal Aldasy and Zsuzsa Mathe developed a vaccine at the institute in Miskolc of the veterinary service which protects against infection with this disease. This is a particularly valuable development since there has never been before a vaccine providing effective protection against myxomatosis, not in Hungary and not in any other location. Dr. Aldasy and his associate isolated and attenuated the virus from which the vaccine is manufactured, using a technique developed in cooperation with Phylaxia and the Veterinary Vaccine Testing Institute. This virus is grown in rabbit-kidney cell

cultures. In a similar manner to that used with the two vaccines described above, it is then lyophilized and dried. In this form it can be stored for a long period of time. It is marketed since 1978 under the name Myxovac. Many countries expressed an interest in it.

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BRIEFS

TEN-FOLD STRENGTH POPPY RAISED--The Hungarian research institute for herbal medicine at Budakalasz near Budapest has developed a new strain of poppy that contains ten times the usual amount of active ingredients. The new strain has been experimentally grown on 1 hectare. An exclusively industrial use of the strain is contemplated. [Text] [Bonn DIE LANDWIRTSCHAFT DES OSTBLOCKS in German No 17, 2 May 79 p 6] 9240

SWISS LICENSE FOR FUNGICIDE PRODUCTION--A Hungarian chemical plant at Peremarton has begun production of the fungicide "Miltox-Spezial" under a license of the Swiss firm "Sandoz." The fungicide serves to destroy fungous disease-causing agents, especially those belonging to the species Peronospora, which cause leaf loss on grape vines. The necessary active ingredient of the fungicide, copper oxychloride, is delivered to the Hungarian plant from the Soviet Union. [Text] [Bonn DIE LANDWIRTSCHAFT DES OSTBLOCKS in German No 17, 2 May 79 p 6] 9240

HUNGARIAN HIGHLIGHTS AT MOSCOW COMPUTER EXHIBIT--The two most important products of the Hungarian computer engineering industry which will go on display at the ESR-MSR [Unified Computer System-Mini Computer System] exhibit soon to open in Moscow will be the ES 1015 and SM 52. To illustrate the remote data transfer potential of the ES 1015, the machine will operate linked to an ES 1015 system in Budapest. The SM 52 will be presented as a big file-handling system of hierarchical buildup for maintaining financial, trade, inventory and personnel records and for performing data processing for the CENTRUM department stores. The familiar Es 1011 will be used to model control of a nuclear reactor, to collect and process metering data, and to process scientific research results. The Es 1010 M will demonstrate an alternate method for the technological control of gas and oil lines. Finally, we merely list a few new peripherals and components which can be used with computers of both the ESR and MSR series: the ES 5074-01 (SM 5601), the SM 5606 floppy disc backup stores, the SM 5500 fixed-head magnetic disc store, the ES 8564 group subscriber terminal which will accommodate four persons, and the SM 7219 video screen terminal. [Text] [Budapest SZAMITASTECHNIKA in Hungarian No 5, May 79 p 1]

CSO: 2502

BRIEFS

ENCIPHERED DATA TRANSMISSION DEVELOPMENT--Encipherment of data in the computerized information systems has not yet been put into practical use in Poland. Even in countries having a highly developed computerized information industry, data encipherment has not yet been fully developed and is actually being performed with the use of simple programming methods, because the monitoring of information on data transmission lines is not yet excessive. Industrial spies can obtain much more important information by conventional means of espionage (audio surveillance, theft of computer printouts, eliciting information from overtalkative employees of a rival firm, etc) instead of monitoring data transmission lines. In conjunction with the increase in value of data and the number of persons who will be a potential threat because of the information in their possession, cryptographic techniques will undoubtedly be important and widely used means of protecting data in the future. [Excerpt] [Warsaw PROBLEMY in Polish No 5, May 79 pp 14-18]

CSO: 2602

BULGARIA/USSR UDC 576.851.49 (Shigella)

PROPERTIES OF R-PLASMID STRAINS OF SH. FLEXNERI, ISOLATED IN BULGARIA

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 3, 1979 pp 51-56 manuscript 6 Jan 78

BRATOYEVA, M., TRIFONOVA, A., Sofia Institute of Infectious and Parasitic Diseases, Academy of Medicine, Bulgaria

[Abstract] Frequency of occurrence of resistant strains of Sh. flexneri circulating in Bulgaria were determined. The character of resistance and properties of extracted R-plasmids were also examined. From 1972-76, 3237 strains of Sh. flexneri were tested for resistance to antibacterial substances. Of these, 50.72% were resistant to one or more substances. Most often the resistance was to tetracycline (20.83%). In 95.88% of the resistant strains, the presence of R-plasmids was determined a majority of which had originated from strains of the most widely spread Shigella flexneri 2a (70 plasmids). Other strains evident were Sh. newcastle (8 plasmids), Sh. flexneri 3a (6 plasmids) and Sh. flexneri 1a (5 plasmids). The R-plasmids were divided into 15 groups according to gene combinations bringing about a particular resistance; 29.03% were resistant to tetracycline, 15.05% to streptomycin-sulfanilamide-tetracycline, 13.98% to chloramphenicol-ampicillin-streptomycin-sulfanilimiide-tetracycline. Of the plasmids, 44.09% belonged to the F-group of incompatibility, 31.18% to I, and 20.43% to N. The F-group had fin^+ (ability to suppress function of replicative factor F) properties and N and I groups were fin^-. The R-plasmids were classified into four groups according to their phage-restrictive abilities. The results indicate widespread presence of Shigella with R-plasmids and stress the necessity for means to eradicate them. References 30: 5 Russian, 25 Western.

CSO: 1840

USSR/GDR UDC 576.851.214.097.22:615.33

STUDY OF PLASMID-DETERMINED RESISTANCE OF STREPTOCOCCI TO ANTIBIOTICS

Moscow ANTIBIOTIKI in Russian Vol 24 No 3, Mar 79 pp 202-207 manuscript received 14 Jul 78

TOTOLYAN, A. A., KOLESNICHENKO, T. G., MALKE, H. and STARKE, R., Laboratory of the Genetics of Microorganisms, Institute of Experimental Medicine, USSR Academy of Medical Sciences, Leningrad; Department of Medical Microbiology, Central Institute of Microbiology and Experimental Therapy, German Democratic Republic Academy of Sciences, Jena

[Abstract] The ERL1 determinant of antibiotic resistance in streptococci, located in the plasmid, was first discovered by H. Malke (MOLEC. GEN. GENET., 1974, Vol 135, pp 349-367). In this connection, the genetic organization of that determinant is tentatively analyzed by means of an investigation of antibiotic-sensitive mutants developed from a strain resistant to erythromycin and lincomycin. The mutants were developed by means of UV irradiation of a suspension of cells of the SM60ERL1 strain. All mutants were found to lose virtually their entire resistance to the antibiotics. The high mutation frequency points to the plasmid localization of the mutants. Since formation of mutants may be associated with loss of plasmid, and along with it of ERL1 determinant, experiments with spontaneous and induced reversion of attributes of resistance to antibiotics were also undertaken. Two classes of mutants sensitive to antibiotics (erythromycin and lincomycin) were isolated. The first class consisted of mutants which lost their plasmid and were incapable of reverting to the "wild" phenotype, that is, of regaining their original high level of antibiotic resistance. The other class consisted of mutants which retained their plasmid--apparently with a defect in the gene responsible for the ERL1 phenotype of the antibiotic resistance of streptococci. The inability of mutants to regain their "wild" phenotype in cross-transduction experiments indicates that resistance to erythromycin and lincomycin, as determined by the ERL1 plasmid, is associated with the same gene or with closely linked genes. References 5: 1 Russian, 4 East German.

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